

Amendments to the Specification:

Pursuant to 37 C.F.R. § 1.121(b) kindly amend the specification as follows. Amendments to the specification are made by presenting replacement paragraphs or sections marked up to show changes made relative to the immediate prior version. The changes in any amended paragraph or section are being shown by strikethrough (for deleted matter) or underlined (for added matter).

Please change the following:

- Page 10, line 20, lines 17-20.

Accordingly, a method for coupling part of a VCT device to a shaft is provided. The method includes the steps of: providing a phaser having a rotor rotating in relation to an opposite part of the phaser, wherein the phaser is axially reduced by eliminating at least one part of the phaser; and ~~irreversibly~~ irreversibly connecting the rotor to the shaft.

- Page 11, lines 10-19.

It is desirable to suitably shorten the axial length of a VCT device such as a phaser by eliminating mounting flange 8 onto a shaft such as the cam shaft 9. As can be seen, by eliminating flange 8, the axial length of the VCT device is shortened in that some axial dimensional contribution in length of flange 8 is reduced. Flange 8 has openings or ~~wholes~~ holes for accommodating or receiving connecting members such as screws 14 for connecting portions of the phaser such as the rotor 1 onto cam shaft 9. New means for connecting portions of the phaser such as the rotor 1 onto cam shaft 9 is disclosed infra. Further, it is desirable to suitably reduce dimensionally the radial size of the VCT device by eliminating fasteners such as screws 14. Thereby region 18 can be eliminated. By eliminating region 18, the radial dimension of the VCT device can be reduced.

- Page 11, lines 20-16.

Referring to Fig. 2, frontal view 10 of a prior art rotor is shown. In the present figure, three lobes 16 are shown. All the rest of the features and parts herein the present figure are substantially similar to that of Fig. 1. a A region 18 is provided for accommodating the screws 14. Region 18 is limited by two concentric circles (in broken line) having a common center. Openings 14a are distributed within region 18 for allowing the screws 14 to pass through for fastening purposes. For example, as shown in Fig. 1, screws 14 transpose through rotor 1 and fasten themselves onto flange 8.

Page 12, lines 1-5.

Referring to Fig. 2A, a frontal face view 10a of the rotor 1a of the present invention is shown. Frontal view 10a is substantially identical to frontal view 10 of Fig. 2 except that region 18 is eliminated. As can be appreciated, the elimination of region 18 causes a reduction of ~~radial~~ radial dimension of rotor 1a in that the area of the front face of rotor 1a is smaller as compared with that of the rotor 1 of Figs 1 and 2.

Page 12, lines 23-27.

Referring to Fig. 5, an alternative embodiment of the present invention is shown. a A cam shaft 9a and a rotor 1b are integrally connected together. Rotor 1b has slots 26 disposed to receive vanes (not shown) preferably made of steel. In other words, the vanes, instead of formed as an extension of the rotor, are separate parts that needs to be inserted into slots 26 in the rotor 1b instead of having them formed an integral part of a rotor.

Page 13, lines 12-13 and lines 28-20.

By way of an example, the present invention teaches method and apparatus to apply VCT technology to desired applications such as connecting parts of a phaser on a first end of a cam shaft. The relevant size of units such as rotor 1a size must be downsized in order to reduce packaging requirements. One factor that limits the axial and radial package of prior art product is the bolt circle diameter that affixes the phaser rotor to the end of the camshaft. In other words, region 18 of Fig. 2 affects or increases the dimension of a phaser, cam shaft combination device. Further, the use of a more permanent means of affixing the rotor to the camshaft is desirable in that a reduction in the radial packaging requirements is achieved. The permanent means can be a ~~non-reversible~~ non-reversible way to affix rotor 1a onto cam shaft 9 in that once the two pieces, rotor 1a or rotor 1b and cam shaft 9, are rigidly affixed to each other; the end product is generally a fixed thing in that taking the thing apart once they are rigidly affixed onto each other tends to render the whole thing useless. By way of a counter example, the prior art uses screws 14 (in Fig. 1) for non-permanently affixing rotor 1 onto cam shaft 9, which is undesirable in that area 18 and flange 8 are required. Area 18 and flange 8 are undesirable because they increase the dimension of an end product such as the phaser. The dimension increases include both an axial increase via the introduction of flange 8, and the radial increase via the introduction of area 18. The present invention teaches the reduction of both the axial dimension and the radial dimension of a VCT device by eliminating both the flange 8 and area 18. As radial package space is reduced, the phaser components can then be pulled under the sprocket which also reduces the required axial package space. The bearing surface for the sprocket would also be incorporated into the end of the camshaft.

Page 14, lines 17-20.

Rotor can also be ~~swaging~~ swaged onto the cam shaft. For example, referring to Fig. 8, by swaging the rotor 1a onto a first end 30b of the camshaft 9, the irreversible connection of rotor and cam shaft is achieved. First end 30b, which may or may not have an internal opening 19a is first inserted or placed into opening 19 of the rotor 1a.

If the cam shaft is formed such that opening 19a transcend or is formed throughout the cam shaft structure, ballizing may be a means of permanently or irreversibly affixing rotor 1a onto cam shaft 9. Initially, shaft 9 is place within rotor 1a such that a first end 30c of cam shaft 9 is within opening 19 of the rotor 1a. A ball 32 made of materials such as a tungsten carbide speeds through opening 19a of cam shaft 9 at a desired speed along a direct such as direction 34. ~~Noted~~ Note that the direction of travel for ball 32 may be the reverse of direction 34. ~~in~~ In other words, the direction of travel may be 180 degrees of direction 34. Therefore, by ballizing the rotor onto the camshaft where the camshaft is a hollow component, the net result is achieved in that the rotor and the cam shaft is permanently or irreversibly affixed together.